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HEWLETT PACKARD COMPANY  
P O BOX 272400, 3404 E. HARMONY ROAD  
INTELLECTUAL PROPERTY ADMINISTRATION  
FORT COLLINS, CO 80527-2400

EXAMINER
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ROSE, HELENE ROBERTA

ART UNIT	PAPER NUMBER
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2163

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/03/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/813,843

Applicant(s)

PELEG ET AL.

Examiner

Helene Rose

Art Unit

2163

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

#### Detailed Action

1. In response to communication entered on 1/12/2007, Claims 4 and 19 were amended. No claims were cancelled nor added. Therefore, Claims 1-22 are presently pending
2. Applicants arguments with respect to claims 1-22 have been considered, but are not persuasive

#### Drawings

3. In view of the objection to the drawings, for failing to comply with 37 CFR 1.84(p)(5) because they included the following reference character(s) not mentioned in the description: Figure 1, does not include server 40, as described in applicants specification, paragraph [0020], line 5; Figure 4, has to diagrams labeled 160, which are the selection operator and delta values; wherein applicants specification within paragraph [0041], selection operator is labeled 169, wherein Figure 4, there is no diagram labeled 169, thus applicant is to look over all Figures, and diagrams have each diagram in accordance with the specification. Examiner withdraws this rejection based on applicant's amendments to Figures 1 and 4.

#### Claim Objections

4. In view of the object to claim 4 being objected to because claim 4 recited the following acronym "DCM". Examiner withdraws the pending rejection based on applicant amendment to claim 4.

#### Claim Rejections – 35 U.S.C – 112

5. In view of the objection to Claim 19 being rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, wherein claim 19, recited the

limitation "recited order" which rendered the claim indefinite because neither the claim nor the specification explained what "recited order" means.

Examiner withdraws the pending rejection based on applicant amendment to claim 19.

### Claim Rejections – 35 U.S.C – 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 3, 5, 11-17, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Sun et al (US Patent No. 5, 963,959, Date of Patent: October 5, 1999).

#### Claim 1:

Regarding Claim 1, Sun teaches a system for performing refresh operations, the system comprising:

a base table having a first plurality of data entries (Figures 2A,B, C, diagram 200, Sun);

a first materialized view that comprises a second plurality of data entries, the second plurality of data entries being associated with the first plurality of data entries in the base table (Figures 2A,B, all features, wherein defined in column 4, lines 29-41, wherein a series of modifications a user might make to a master table and the corresponding entries recorded in a master log and master table 200 within FIG. 2(a) is a table of customer information including a column for a primary key CID, a customer

identifier, and a column ZIP for a customer's ZIP code, wherein each row represents a particular customer, who is assigned a non-null, unique identifier, CID, wherein the corresponding master log 210 is empty and wherein master table 200 of FIG. 2(b) is the result of adding a new customer with a CID of 5 and a ZIP of 22046 to master table 200 of FIG. 2(a), wherein the primary key value of the inserted row, 5, is recorded in master log 210, Sun);

a refresh log that contains a plurality of changes in the base table (Figure 2C, wherein column 4, lines 42-49, the result of deleting the customer identified CID of 2 from the master table, the primary key value of 2 is stored as a new entry in master log, wherein if the zip code of customer CID of 4 in master table is changed from 22090 to 20190, then the master table is the result, the primary key value 4 of the updated row is stored as a new entry in master log, Sun); and

a module adapted to perform a refresh operation on the first materialized view using the second plurality of data entries, the module configured to (Figure 3, all features, wherein column 5, lines 10-15, the operation of a fast refresh mechanism, wherein the primary key values are selected from the master log which are not found in the master view the, the result of reissuing the snapshot definition query on the master table, Sun);

access the refresh log and the first materialized view (column 6, lines 65-66, wherein master table is accessed by the primary key values recorded in the master log, Sun);

calculate a plurality of delta values from the plurality of changes in the refresh log and the second plurality of data entries in the first materialized view (column 6, lines 43-45, wherein two new rows with column primary key, i.e. CID, of 5 and 6 are added, resulting in snapshot, diagram 400 within Figure 4e, Sun);

apply the plurality of delta values to the second plurality of data entries in the first materialized view (Figures 7A and B, all features, wherein defined in column 8, lines 52-67, Sun); and  
provide the plurality of delta values to a delta adaptation module for updating a second materialized view (column 9, lines 27-49, Sun).

Claim 3:

Regarding Claim 3, Sun teaches wherein the first plurality of data entries and the second plurality of data entries each include one of a plurality of grouping identifiers that associate each of the first plurality of data entries with the second plurality of data entries (Figures 2A,B, and C, all features, wherein 2A, illustrates a plurality of data entries, and Figure 2B, illustrates another second plurality of data entries, and Figure 2C, diagram 210, illustrates a plurality of CID, i.e. column for primary key, which is equivalent to group identifiers, which is associated with Figures 2A, and B, which are the first and second data entries, Sun).

Claim 5:

Regarding Claim 5, Sun teaches wherein the second plurality of data entries each comprises a grouping field and a count field (Figure 6C, contains a CID, equivalent to a group field and Time\$\$ which is equivalent to count field, wherein it's a value that is added, wherein clarified in column 7, lines 51-58, Sun).

Claim 11:

Regarding Claim 11, Sun teaches a system for performing a refresh operation, comprising:

means for deriving a first materialized view from at least one base table (Refer to claim 1, wherein this limitation substantially the same/or similar, Sun);

means for accessing a refresh log and the first materialized view to perform the refresh operation on the first materialized view (Refer to claim 1, wherein this limitation substantially the same/or similar, Sun);

means for calculating a plurality of delta values by combining a plurality of changes in the refresh log and a plurality of entries in the first materialized view (Refer to claim 1, wherein this limitation substantially the same/or similar, Sun);

means for applying the plurality of delta values to the first materialized view (Refer to claim 1, wherein this limitation substantially the same/or similar, Sun); and

means for providing the plurality of delta values to a delta adaptation module for refreshing a second materialized view (Refer to claim 1, wherein this limitation substantially the same/or similar, Sun).

Claim 12:

Regarding Claim 12, Sun teaches a method of performing a refresh operation, the method comprising:

deriving a first materialized view from a base table (Refer to claim 1, wherein this limitation substantially the same/or similar, Sun);

obtaining a refresh log and the first materialized view to perform the refresh operation on the first materialized view (Refer to claim 1, wherein this limitation substantially the same/or similar, Sun);

calculating a plurality of delta values by combining a plurality of changes in the

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refresh log and a plurality of entries in the first materialized view (Refer to claim 1, wherein this limitation substantially the same/or similar, Sun);

applying the plurality of delta values to the first materialized view (Refer to claim 1, wherein this limitation substantially the same/or similar, Sun); and

providing the plurality of delta values to a delta adaptation module for refreshing a second materialized view derived from the first materialized view (Refer to claim 1, wherein this limitation substantially the same/or similar, Sun).

Claim 13:

Regarding Claim 13, Sun teaches wherein obtaining and calculating are performed in a database management system ("DBMS") (column 5, lines 6-9, Sun).

Claim 14:

Regarding Claim 14, Sun teaches wherein applying the plurality of delta values comprises utilizing a plurality of operators to modify the first materialized view (column 8, lines 58-60, Sun).

Claim 15:

Regarding Claim 15, Sun teaches wherein the plurality of delta values to a delta processing module that applies the plurality of delta values to the first materialized view (see abstract, wherein the primary key values of the modified rows are recorded in a master log, wherein in response to a fresh command differences between the master table and snapshot are reconciled based on primary key values stored in the master table, the master log, and the snapshot, Sun).

Claim 16:

Regarding Claim 16, Sun teaches wherein processing the plurality of delta values in the delta adaptation module to create a plurality of second materialized view changes for



the second materialized view (Figures 7A and 7B, wherein diagram 710 illustrates updateable snapshot log, and wherein 7B, diagram 710 illustrates snapshot log which is equivalent to a delta adaptation module, wherein OLD\$\$ indicates a primary key value is old or new, MOD\$\$, indicates insert, delete, update, and TIME\$\$ illustrates a refresh timestamp, and CID and TIME\$\$, are already created, see diagram 210, Figures 2A,B, and C, in which CID is equivalent to the group identifier; column 8, lines 65-67, wherein updateable snapshot of Figure 7b is the result of adding a new customer with a CID of 5 and a ZIP of 22046 to updateable snapshot, which is equivalent to creating a plurality of second materialized view changes, Sun);

calculating a plurality of second materialized view delta values that represent the plurality of second materialized view changes to be applied to the second materialized view (column 9, lines 1-6, Sun); and

applying the plurality of second materialized view changes to the second materialized view (Figure 7C, all features, wherein MOD\$\$ illustrates insert, i.e. I, and delete, i.e. D, with CID's 5 and 2, in which it is associated with diagram 700 within 7C, wherein CID 2 is deleted from diagram 700 in Figure 7C and wherein Figure 7B, CID 5 is requested to be inserted by the MOD\$\$, wherein it is shown in Figure 7C, that it was inserted, in which a change was made, and viewed. Sun).

Claim 17:

Regarding Claim 17, Sun teaches wherein combining a tuple table with the plurality of delta values and projecting the plurality of second materialized view changes based upon the tuple table and the plurality of delta values (column 4, lines 8-17, wherein a primary key is a set of columns in a table having a combined value that is unique and non-null

within a table, wherein a primary key value is able to uniquely identify each row in the table, and wherein since rows are uniquely identified by primary key values the fast refresh mechanism, employs primary keys, wherein the primary key values of modified rows of a master table are recorded in a master log, Sun).

Claim 20:

Regarding Claim 20, Sun teaches a computer program, comprising:

a machine-readable medium (column 3, lines 59-65, Sun);

a refresh log stored on the machine readable medium, the refresh log containing a plurality of change entries (Refer to claim 1, wherein this limitation is substantially the same/or similar, Sun); and

a refresh manager stored on the machine readable medium, the refresh manager being adapted to refresh a first materialized view derived at least in part from a base table by computing a plurality of delta values in a delta calculation module based on the refresh log (column 8, lines 55-64, wherein MOD\$\$ has three values: 'I' for insert, 'D' for delete, and 'U' for update and the updateable snapshot log 710 has an old/new column, wherein the OLD\$\$, which indicates whether a primary key value for the row is old, i.e., O, or new, i.e. U, or unchanged, i.e., U, which is interpreted to be the "plurality of data values", column 6, lines 43-44, wherein two new rows with CID of 5 and 6 are added resulting in a snapshot, in which this is interpreted to be equivalent to "the refresh manager being adapted to refresh a first materialized view derived at least in part from a base table by computing a plurality of delta values in a delta calculation module based on the refresh log", wherein the refresh manager is interpreted to be the "snapshot", Sun), and the first materialized view, applying the plurality of delta values in a delta processing module to the first materialized

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view (Refer to claim 1, wherein this limitation is substantially the same/or similar, Sun), and providing the plurality of delta values to a delta adaptation module derived from the first materialized view (Refer to claim 1, wherein this limitation is substantially the same/or similar, Sun).

### Claim Rejections 35 U.S.C – 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 2, 4, 6-10, 18-19 and 21-22 has been rejected under 35 U.S.C. 103(a) as being unpatentable over anticipated by Sun et al. (US Patent No. 5,963,959, Date of Patent: 10/5/1999) in view of Gupta et al. (US Patent No. 7,111,020, Filing Date: 3/26/2002).

#### Claim 2:

Regarding Claim 2, Sun discloses all the limitations above. However, Sun does disclose a method a method of calculating (column 6, lines 43-45, wherein two new rows with column primary key, i.e. CID, of 5 and 6 are added, resulting in snapshot, diagram 400 within Figure 4e, Sun). Sun is silent with respect to wherein the delta calculation module and a delta processing module calculates the plurality of delta values and the delta processing module directs a plurality of operators based on the operators.

On the other hand, Gupta discloses wherein a delta calculation module ("DCM") and a delta processing module ("DPM") in the module, wherein the DCM calculates the plurality of delta values and the DPM directs a plurality of operators based upon the plurality of delta values (column 2, lines 31-36; column 3, lines 51-57; and column 5, lines 61-67, Gupta).

It would have been obvious to one of the ordinary skill in the art at the time of the invention to incorporate a method for calculating and management of a database system by Gupta within Sun system to provide faster execution to reduce costly operations, and to improve the system performance.

Claim 4:

Regarding Claim 4, the combination of Sun in view of Gupta teaches wherein the DCM utilizes the plurality of group identifiers to combine the second plurality of data entries with the plurality of changes (Figures 1A and 1B, all features, Gupta).

Claim 6:

Regarding Claim 6, Sun in view of Gupta teaches a system for performing a pipelined refresh, the system comprising:

- a first materialized view derived at least partially from a base table (Figure 1B, diagram 142, Gupta);

- a refresh log having a plurality of entries, each of the plurality of entries corresponding to a change in the base table (Refer to claim 1, wherein this limitation has already been addressed, Sun), a second materialized view derived at least partially from the first materialized view (Figure 1B, diagram 144, Gupta);

- a refresh module that comprises;

a first delta calculation module that calculates a plurality of delta values that represents the changes to the first materialized view (column 2, lines 31-36, Gupta);

a first delta-processing module that applies the plurality of delta values to the first materialized view (column 2, lines 37-41, Gupta);

a delta adaptation module that receives the plurality of delta values from the first delta calculation module and calculates a plurality of changes to the second materialized view (column 3, lines 51-57, Gupta);

a second delta calculation module that obtains the plurality of changes to the second materialized view from the delta adaptation module (Figure 4B-1 and 2, and 4C-1 and 2, all features, wherein it illustrates a log used to track changes to base tables for an incremental refresh mechanism, Gupta); and

a second delta-processing module that applies the plurality of changes to the second materialized view from the second delta calculation module to the second materialized view (Figure 5A, diagrams 502, 504, and 506, Gupta).

Claim 7:

Regarding Claim 7, the combination of Sun in view of Gupta teaches wherein the plurality of entries in the refresh log correspond to a plurality of first materialized view entries in the first materialized view through a plurality of grouping identifiers that associate each of the plurality of entries with the plurality of first materialized view entries (Figure 2, all features, Gupta).

Claim 8:

Regarding Claim 8, Sun in view of Gupta teaches wherein a plurality of operators utilized by the first delta processing module to modify the first materialized view based

upon the plurality of delta values (Figure 3A, all features, Gupta).

Claim 9:

Regarding Claim 9, the combination of Sun in view of Gupta teaches wherein the second delta calculation module is configured to calculate a plurality of second materialized view delta values from the plurality of changes and deliver the plurality of second materialized view delta values to the second delta processing module (Refer to claim 6, wherein these limitation are substantially the same/ or similar, Gupta).

Claim 10

Regarding Claim 10, the combination of Sun in view of Gupta teaches wherein the second delta-processing module is configured to utilize the plurality of second materialized view delta values to apply the plurality of changes to the second materialized view (Refer to claim 6, wherein this limitation is substantially the same/or similar, Gupta).

Claim 18:

Regarding Claim 18, the combination of Sun in view of Gupta teaches wherein calculating the plurality of second materialized view delta values that represent the plurality of second materialized view changes to be applied to the second materialized view does not involve accessing a refresh log for the second materialized view (column 6, lines 27-31, Gupta).

Claim 19:

Regarding Claim 19, the combination of Sun in view of Gupta teaches wherein the method is performed in the recited order (column 14, lines 49-51, Gupta).

Claim 21:

Regarding Claim 21, the combination of Sun in view of Gupta teaches wherein each of the plurality of change entries comprises a group identifier (column 16, lines 12-16, wherein rows are grouped by customer\_id and region, Gupta).

Claim 22:

Regarding Claim 22, the combination of Sun in view of Gupta teaches wherein the delta calculation module combines the plurality of change entries and a plurality of entries in the first materialized view to create the plurality of delta values (column 12, lines 3-10, Gupta).

**Examiner Response to Applicant's Arguments**

Applicant States:

Legal Precedent

The Applicants respectfully traverse the rejection. The burden of establishing a prima facie case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (PTO Bd. App. 1979). Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984).

Accordingly, to establish a prima facie case, the Examiner must not only show that the combination includes all of the claimed elements, but also a convincing line of reason as to why one of ordinary skill in the art would have found the claimed invention to have been obvious in light of the teachings of the references. *Ex parte Clapp*, 227 U.S.P.Q. 972 (B.P.A.I. 1985). When prior art references require a selected combination to render obvious

a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988).

Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. *Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988).

Examiner Response:

Examiner is not persuaded. In response to applicant's argument that the examiner conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Applicant States:

The rejection of independent claims 1, 11, 12 under Section 103 is improper because the Sun reference and the Gupta reference, either alone or in combination, do not teach, suggest or illustrate each and every element recited by the Applicants' claims. For example, independent claim 1 recites a system for performing refresh operations comprising a



module configured to" access the refresh log and the first materialized view; calculate a plurality of delta values from the plurality of changes in the refresh log and the second plurality of data entries in the first materialized view; apply the plurality of delta values to the second plurality of data entries in the first materialized view; and provide the plurality of delta values to a delta adaptation module for updating a second materialized view."

(Emphasis added). Independent claim 11 recites a system for performing a refresh operation comprising "means for accessing a refresh log and the first materialized view to perform the refresh operation on the first materialized view; means for calculating a plurality of delta values by combining a plurality of changes in the refresh log and a plurality of entries in the first materialized view; means for applying the plurality of delta values to the first materialized view; and means for providing the plurality of delta values to a delta adaptation module for refreshing a second materialized view." (Emphasis added).

Further, independent claim 12 recites a method of performing a refresh operation comprising "calculating a plurality of delta values by combining a plurality of changes in the refresh log and a plurality of entries in the first materialized view; applying the plurality of delta values to the first materialized view; and providing the plurality of delta values to a delta adaptation module for refreshing a second materialized view derived from the first materialized view." (Emphasis added).

In contrast, the Applicants contend that the passages of the Sun reference referred to by the Examiner do not disclose the above claim limitations. For example, the Sun reference states, "the master table itself is accessed by the primary key values recorded in the master log." Sun, col. 6, lines 65-66. This disclosure has been interpreted by the Examiner to correspond to the claimed module configured to access the refresh log and the

first materialized view, as recited by independent claims 1, 11 and 12. This analysis incorrectly equates Sun's master table for Applicants' claimed refresh log. However, as appreciated by those skilled in the art, a master table is clearly not a refresh log. Therefore, the aforementioned claim limitation is not disclosed by the Sun reference.

Further, as set forth by the Examiner, the Sun reference discloses that:

In the example, two new rows with CIDs of 5 and 6 are added, resulting in snapshot 400 of FIG. 4(e). The result of all these operations in the fast refresh is that snapshot 400 of FIG. 4(e) is consistent with master view 404. Sun, col. 6, lines 43-45.

This disclosure describes two new rows added to a snapshot (materialized view) which the Examiner interpreted to read the claimed module configured to calculate a plurality of delta values from the plurality of changes in the refresh log and the second plurality of data entries in the first materialized view. Applicants note that the above-cited disclosure of the Sun reference clearly does not teach a plurality of delta values, let alone calculating such delta values from a plurality of changes in a refresh log and a second plurality of data values in a first materialized view. Applicants request the Examiner to specifically point out where in the Sun reference such a recitation is taught in its entirety. Absent any such disclosure, the Applicants respectfully assert that the rejection of all claims based on Sun in view of Gupta is defective and should be withdrawn.

Examiner Response:

Examiner is not persuaded. Referring to the limitation "access the refresh log and the first materialized view, SEE SUN - column 8, lines 30-35, wherein an updateable snapshot is a snapshot to which a user at the snapshot site is allowed to make changes, wherein the changes to the snapshot are detected, preferably by an trigger, asynchronously

or synchronously propagated to the master site and also wherein "snapshot" is defined to be a copy of a table, which is interpreted to be a "materialized view" and logged in an updateable snapshot log, which is interpreted to be equivalent to "accessing" and "wherein "updateable snapshot" is interpreted to be equivalent to "refreshing", and therefore interpreted to be equivalent to "access the refresh log and the first materialized view".

In response to prior art does not teach a plurality of delta values and a second plurality of data values in a first materialized view, SEE SUN - column 8, lines 45-67, wherein column 5, lines 28-32, wherein PK1 . . . PKn are the primary key columns, wherein primary key columns is interpreted to be the "delta values; and mlog\$ stands for the master log; and mview\$ stands for a view of the master table, is interpreted to be the "data value", which may be a materialized view, a macro or other unmaterialized view, or simply an embedded select statement, wherein this is interpreted to be equivalent to "a plurality of delta values and a second plurality of data values in a first materialized view".

Applicant States:

Further, the Sun reference states that: FIGS. 7(a)-7(e) illustrates a series of modifications made to a master table and the corresponding entries recorded in a master log. Updateable snapshot 700 of FIG. 7(a) is a snapshot of customer information including a column for a primary key CID, a customer identifier, and a column ZIP for a customer's ZIP code. Each row represents a particular customer, who is assigned a non-null, unique identifier, CID. At this point, the corresponding updateable snapshot log 710 is empty.

Updateable snapshot log 710 comprises at least four columns. Updateable snapshot log 710, like master log 210, has one or more columns for the primary key, in this example, a CID column and a column for a refresh timestamp, TIME\$\$ as described above. In

addition, updateable snapshot log 710 has a column MOD\$\$ which indicates the kind of modification performed. In one embodiment, MOD\$\$ has three values: 'I' for insert, 'D' for delete, and 'U' for update. Furthermore, updateable snapshot log 710 has an old/new column, OLD\$\$, which indicates whether a primary key value for the row is old ('O'), new ('N'), or unchanged ('U'). In one embodiment, the MOD\$\$ and OLD\$\$ columns are also present in the master logs.

Updateable snapshot 700 of FIG. 7(b) is the result of adding a new customer with a CID of 5 and a ZIP of 22046 to updateable snapshot 700 of FIG. 7(a).

Sun, col. 8, lines 52-67.

The above disclosure merely describes column entries of snapshot tables 700 and 710, but clearly does not teach a module configured to apply the plurality of delta values to the second plurality of data entries in the first materialized view, as recited by independent claims 1, 11 and 12. Absent such a teaching, suggestion or illustration, the rejection of Applicants' claims based on Sun in view of Gupta is defective and should be withdrawn.

Moreover, the Gupta reference does not cure the deficiencies of the Sun reference because it, too, lacks disclosures teaching the above claim limitations. Moreover, the recited claim limitations are not even alleged by the Examiner to be disclosed by Gupta. For at least these reasons, the Applicants respectfully assert that the rejection of claims 1-22 under Section 103 based on Sun in view of Gupta is erroneous and should be withdrawn.

**Examiner Response:**

Examiner is not persuaded. In response to applicant argument prior art fails to teach a module configured to apply the plurality of delta values to the second plurality of data entries in the first materialized view, SEE SUN - column 5, lines 10-12, wherein a fast

refresh mechanism is defined and interpreted to be equivalent to the "module configured to apply the plurality of delta values to the second plurality of data entries in the first materialized view".

Applicant States:

The rejection of independent claims 6 and 20 under Section 103 is improper because neither the Gupta nor the Sun reference, nor their hypothetical combination discloses each and every element recited by the claims. For example, independent claim 6 recites a system for performing a pipelined refresh comprising a refresh module that comprises "a first delta calculation module that calculates a plurality of delta values that represents the changes to the first materialized view; a first delta processing module that applies the plurality of delta values to the first materialized view; a delta adaptation module that receives the plurality of delta values from the first delta calculation module and calculates a plurality of changes to the second materialized view; a second delta calculation module that obtains the plurality of changes to the second materialized view from the delta adaptation module; and a second delta processing module that applies the plurality of changes to the second materialized view from the second delta calculation module to the second materialized view." Independent claim 20 recites a computer program comprising a machine readable medium comprising "a refresh manager stored on the machine readable medium, the refresh manager being adapted to refresh a first materialized view derived at least in part from a base table by computing a plurality of delta values in a delta calculation module based on the refresh log and the first materialized view, applying the plurality of delta values in a delta processing module to the first materialized view, and providing the

plurality of delta values to a delta adaptation module derived from the first materialized view."

In rejecting independent claims 6 and 20 the Examiner primarily cited the Gupta reference as disclosing the above claim elements, however, in contrast to the Examiner's assertions, Applicants contend that the Gupta reference does not disclose or suggest such elements.

For example, as set forth in the rejection, the Examiner cited the following passage of the Gupta reference:

Materialized views eliminate the overhead associated with gathering and deriving the data every time a query is executed. Computer database systems that are used for data warehousing frequently maintain materialized views that contain pre-computed summary information in order to speed up query processing. Such summary information is created by applying an aggregate function, such as SUM, COUNT, or AVERAGE, to values contained in the base tables. Materialized views that contain pre-computed summary information are referred to herein as "summary tables" or more simply, "summaries". Summary tables typically store aggregated information, such as "sum of PRODUCT\_sales, by region, by month." Other examples of aggregated information include counts of tally totals, minimum values, maximum values, and average calculations.

According to this passage, Gupta teaches aggregate functions that are not used to obtain delta values, such as those derived from obtaining a difference or changes between at least two values. The functions recited by the Gupta reference, such as SUM, COUNT and AVERAGE, are clearly not adapted to do so. Thus, Gupta does not disclose the claimed first delta calculation module that calculates a plurality of delta values that represents the

changes to the first materialized view. Based on the above analysis, it is apparent that Gupta does not teach, suggest or illustrate a first delta processing module that applies the plurality of delta values to the first materialized view, as recited by independent claims 6 and 20. Because the Gupta reference does not disclose a first delta calculation module or a first delta processing module, it would be illogical for Gupta to disclose a second delta calculation module or a second processing delta module as recited by independent claim 6.

**Examiner Response:**

Examiner is not persuaded. Referring to the limitation that prior art fails to teach, “first delta calculation module that calculates a plurality of delta values that represent the changes to the first materialized view”. SEE GUPTA - column 2, lines 31-36, wherein applying an aggregate function such as SUM, COUNT, AVERAGE, to values contained in the base tables, wherein the materialized views that contain pre-computed summary information are referred to as summary tables, or summaries, wherein this is interpreted to be equivalent to “calculates a plurality of delta values”; column 3, lines 51-57, wherein the materialized data is updated based on just the new base data, i.e., changes made to the base tables subsequent to the most recent refresh operation, and column 9, lines 47-52, wherein Log RLog includes rows and columns snaptime\$\$, oldnew, rid, region, sales\_person, and sales, and Log RLog is a row-based log because its rows record changes to a particular row in a particular table, referred to herein as the master table, in which table T is the master table, and wherein this is overall equivalent to “delta calculation module that calculates a plurality of delta values that represent the changes to the first materialized view”.

**Prior Art of Record**

1. Sun et al (US Patent No. 5,963,959) discloses a method and apparatus employs primary key values stored in a master table to drive a fast refresh mechanism for a snapshot defined on the master table.
2. Gupta et al (US Patent No. 7,111,020) discloses techniques for improving efficiency of database systems, and refreshing materialized views by the database system and rewriting queries to access the maintained views.
3. Arora (US Patent No. 6,708,179) discloses a framework for the incrementally refreshing a materialized view.
4. Lawande et al. (US Patent No. 6,882,993) discloses a method for incrementally refreshing a materialized view after multiple operations on a row of a base table of the materialized view by determining an equivalent operation and refreshing the materialized view according to the equivalent operation.



**Conclusion**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

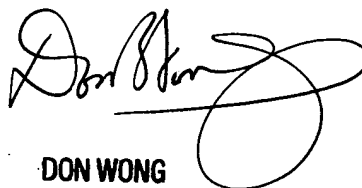
**Point of Contact**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helene Rose whose telephone number is (571) 272-0749. The examiner can normally be reached on 8:00am - 4:30pm Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on (571) 272-1834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HRR  
Technology Center 2100  
March 26, 2007

  
**DON WONG**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2100**